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## China - Peoples Republic of

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### China Releases the Code of Hygienic Practice for Storage and Transportation of Raw Grains

**Report Categories:**

FAIRS Subject Report

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**Report Highlights:**

On December 23, 2016, the National Health and Family Planning Commission (NHFPC) and the China Food and Drug Administration (CFDA) released the National Food Safety Standard for Code of Hygienic Practice for Grain Processing (GB 22508-2016), which will be implemented on December 23, 2017. This Standard applies to the storage and transport of unprocessed food grains, including hygienic requirements for raw grains, depot area environment, storage facility and equipment, transportation facilities and equipment, and safety control measures, etc. A draft of this standard was notified to the WTO as SPS CHN 1001 in September 2015. Please note that the comment process has ended and that this standard is considered final.

The following report contains an unofficial translation of the final standard.

## **General Information:**

### **BEGIN TRANSLATION**

## **National Food Safety Standard**

### **Code of Hygienic Practice for Storage and Transportation of Raw Grains**

#### **Foreword**

This Standard supersedes the GB/T 22508-2008 *Operating Practice for Prevention and Reduction of Mycotoxin Contamination in Grains*

Compared with the GB/T 22508-2008, the main changes in this Standard are as follows:

- The name of this Standard has been changed to *National Food Safety Standard - Code of Hygienic Practice for Storage and Transportation of Raw Grains*
- The contents of planting, pre-harvesting and harvesting time have been deleted;
- The contents on prevention and reduction of mycotoxin contamination in the formal standard have been modified to the contents on prevention and reduction of possible biological, chemical and physical contaminations in the process of storage and transportation of raw grains;
- The requirements for control of hazard factors in storage and transportation of raw grains have been refined and the standard operability has been improved.

## **National Food Safety Standard**

### **Code of Hygienic Practice for Storage and Transportation of Raw Grains**

#### **1 Scope**

This Standard specifies the basic requirements and management rules for environment, facilities, equipment and personnel in the storage area in the process of storage and transportation of raw grains.

This Standard is applicable to the storage and transportation of raw grains.

#### **2 Terms and Definitions**

The terms and definitions given in GB 14881-2013 apply to this Standard.

##### **2.1 Raw grain**

General designation of unprocessed grain, e.g., rice, wheat, corn and soybean, etc.

##### **2.2 Storage and transportation of raw grains**

The storage and transportation of the raw grains.

##### **2.3 Granary**

The building for storage of raw grains and meeting the basic functional requirements of grain storage.

## **2.4 Safe moisture content**

The highest moisture content of a certain grain that can remain safe in summer locally without becoming heated and mildewed under the conventional storage and transportation conditions.

## **2.5 Contamination**

A process in which the raw grain is invaded by harmful substances (including biological, chemical and physical contaminations) in process of storage and transportation, resulting in the changes in its quality safety, nutrition or sensory properties.

## **3 Hygienic Requirements of Raw Grains**

The raw grain shall meet the relevant requirements of GB2715, GB2761, GB2762 and GB2763 in the process of acquisition, storage and transportation.

## **4 Depot Area Environment**

4.1 The consideration shall be given to the potential contamination risk caused by the depot area environment to the storage of raw grain, and the appropriate measures shall be taken to minimize the risk.

4.2 The grain depot shall have a reasonable layout with obvious division of various functional areas and appropriate separation and segmentation measures.

4.3 The roads in grain depot shall be paved with cement concrete; and for the open spaces in the depot, the necessary measures shall be taken, e.g., paving with cement concrete and tiles, to keep the environment clean and prevent the occurring raise dust and accumulated water under normal weather conditions.

4.4 The granary shall be built far away from the pollution sources and hazard sources, avoid the flooding areas and low-laying waterlogging area, and the places with potential hazard of huge insect pest breeding around the granary.

4.5 The goods yard and work area shall be kept clean, and the residual grains, dust and sundries shall be removed in time.

## **5 Requirements for Storage Facility and Equipment**

5.1 The granary shall be constructed and designed in accordance with the relevant national regulations and standards.

5.2 The technological operation of the granary shall be determined based on the granary function, type, grain delivery and storage mode, storage period and other conditions, considering the needs for loading and unloading, transportation, cleaning, dust removal, measurement, storage, packing, drying, inspection (test), mechanical ventilation, grain detection, fumigation and other operations, and the technological process shall be most reasonable, to ensure it is safe, simple and flexible. The combination of granary and factory shall also comply with the relevant requirements of GB13122.

5.3 The contact surfaces of the equipment and tools in contact with the raw grain shall be made of safe, non-toxic and odorless materials, and shall be easy to carry out cleaning and maintenance.

5.4 All production equipment shall avoid, from design and structure, the parts, metal debris, lubricating oil or other contaminants from entering the grain, and shall be easy to carry out cleaning, inspection and maintenance.

5.5 The granary doors, windows and air vents shall be tightly sealed and heat insulated. The doors, windows, openings and holes shall be protected with insect-pest control facilities, such as pest control boards, insect screens and so on.

5.6 prior to placing the grain in the granary, the granary, equipment, devices and materials shall be inspected, cleaned and maintained, and the live insects that are discovered, shall be killed by using the insecticides permitted for use by the state, to ensure the granary, doors and windows are intact, all empty granaries, equipment, devices and materials shall be free of residual grains, dust, debris and live insects.

## **6 Requirements for Transportation Facilities and Equipment**

6.1 The grain carriage (compartment) shall have good sealing performance and humidity resistance, and shall be equipped with the equipment for protection against dust, fly, sunshine and rainwater. When the raw grains are loaded for transportation by railroad, the open wagons shall be well covered with tarpaulin or waterproof plastic clothes that shall be tied firmly.

6.2 The same transportation means must be loaded with the same grain. If different grains must be loaded in the same transport due to special circumstance, the corresponding isolation measures shall be taken and the obvious marks shall be provided.

6.3 The vehicles or ships loaded with gains must be padded with beddings (except for special-purpose railway K17, L18 bulk gran vehicles), the bedding materials shall be made of hessian cloth and woven plastic sheet and other non-hygroscopic materials.

6.4 In case of waterway transportation, the compartment cover shall be closed and sealed tightly after the grain is loaded.

## **7 Hygienic Management**

### **7.1 Hygienic management system**

7.1.1 The health management system and assessment index shall be formulated and the post responsibility system shall be implemented.

7.1.2 The health inspection plan shall be formulated, and the plan implementation shall be recorded and archived.

### **7.2 Granary and facility hygienic management**

7.2.1 The granary and related facilities shall be kept clean, checked and maintained periodically, and any problem that is found shall be removed.

7.2.2 The granary and related facilities shall be cleaned and insect-killed before loading and after the grain is delivered, to ensure that there are no residual contaminants and the relevant records are kept.

## **8 Grain safety control in storage and transportation process**

### **8.1 General Requirements**

8.1.1 The raw grains failed to comply with the requirements of B2715, GB2761, GB2762 and GB2763, shall be stored in the designated area and marked obviously, and shall be disposed according to the relevant national provisions.

8.1.2 The numbers of impurities and breakage, wormhole, buds, mildews, scabs and other damaged particles of the grains in storage shall be minimized, the storage and transportation facilities and equipment shall be kept clean and dry, to prevent the microbial contamination.

## **8.2 Biological contamination control**

### **8.2.1 Grain safe moisture content**

8.2.1.1 If the grain moisture content is higher than the safe moisture content after the grain is transported to the destination, the drying measures shall be taken in time when the grain are warehoused to reduce the grain moisture content within the safe moisture value.

8.2.1.2 The grain moisture content shall be checked regularly in the storage process and recorded properly. If the grain moisture content is higher than the safe moisture content, the drying measures shall be taken to reduce the grain moisture content within the safe moisture value. The moisture monitoring in the storage and transportation process can be implemented with reference to Appendix A.

### **8.2.2 Temperature and humidity**

8.2.2.1 If the grain monitoring result shows an abnormal point of temperature, the local ventilation measure shall be taken in time to drop the temperature. If the grain is mildewed, the mildewed grain shall be treated by sterilizing and destroying the mildews, or the local removal and other measures shall be taken to clear the granary of the mildewed grain, and then the harmless treatment shall be done. The temperature and humidity monitoring in the storage and transportation process can be implemented with the reference to Appendix B.

8.2.2.2 If the temperature in granary is higher, the timely ventilation and heat dissipation, refrigeration and air conditioning or taking the grain out for sunning is required.

### **8.2.3 Pest control**

8.2.3.1 The cleaning sanitation and insecticidal treatment work of the empty granary, devices and materials, and transportation means shall be done.

8.2.3.2 The sealing doors and windows shall be installed. The insect-prevention lines shall be provided at the doors, windows, openings and holes.

8.2.3.3 The temperature and relative humidity of the granary shall be kept at the lowest level, to control the growth of the number of pests.

8.2.3.4 The gran storage protectant, fumigant or air conditioning and other pest control technologies for grain storage to prevent the pests and mites infecting the grains.

## **8.3 Chemical contamination control**

8.3.1 The management system shall be established to prevent chemical contamination, and the appropriate control plan and control procedures shall be developed.

8.3.2 The chemicals meeting the requirements for grain storage shall be selected and used in

accordance with the relevant national regulations and standards. The use of chemicals shall be registered and the record shall be kept.

8.3.3 The chemicals for grain storage shall be stored separately, labeled clearly and in the custody of dedicated persons.

#### **8.4 Physical contamination control**

8.4.1 The management system shall be established to prevent foreign object contamination, and the corresponding control plan and control procedures shall be developed.

8.4.2 The equipment maintenance, health management, field management, foreign personnel management and other measures shall be taking to ensure the grain from being contaminated by foreign bodies (such as glass or metal debris, dust, sand and other contaminants).

8.4.3 The effective measures shall be taken to eliminate the impurities and prevent other foreign materials entering the grain, and the harmless treatment of the impurities removed shall be done.

8.4.4 When conducting field repair, maintenance, construction and other operations, the appropriate measures shall be taken to prevent the grain from being contaminated by foreign matters, peculiar smell and debris.

#### **8.5 Materials in direct contact with grain**

All materials in direct contact with the grain shall be non-toxic and harmless, and cause no contamination to the grain.

#### **8.6 Transportation**

8.6.1 The vehicles, ships and containers for transportation of grains shall be completely cleaned before each grain shipment, and if loaded with other materials, shall be cleaned and disinfected before loading and transporting the grain.

8.6.2 The transported container and equipment shall be used as they were designed, and the raw grain shall not be transported together with chemical materials or toxic substances.

8.6.3 The temperature and humidity shall be maintained within the prescribed limits in the process of transportation, to prevent the grain mildewing.

8.6.4 In the freight yards at the stations and wharfs for loading and unloading grains, the berths shall be for special use, and the places where the pesticides, fertilizers and other toxic and harmful substances were piled up, shall be thoroughly cleaned and blocked up. There shall be free or contaminants around the yard.

### **9 Inspection**

9.1 The grain out-storage inspection system shall be established to issue the inspection report.

9.2 The inspection shall be carried out through self-inspection or by entrusting the food inspection institution with appropriate qualifications.

9.3 The inspection room and inspection capacity adaptive to the inspection items shall be provided for self-inspection; and the inspection shall be carried out by qualified inspectors according to the prescribed inspection method.

9.4 The perfect laboratory management system shall be established to properly keep various inspection records and inspection reports. The product sample reservation system shall be established for timely sample reservation.

## **10 Training**

10.1 The training system shall be established to train the relevant personnel on corresponding food safety knowledge.

10.2 The annual training plan shall be worked out according to different post systems to carry out corresponding training, and the workers involved in special type of work shall possess required work permits.

10.3 The training plan shall be audited and revised periodically to evaluate the training effect and carry out routine inspection, to ensure its effective implementation.

10.4 The training record shall be kept properly.

## **11 Management System and Personnel**

11.1 The grain safety management system shall be established and improved and the corresponding management measures shall be taken to control the entire process of grain storage and transportation.

11.2 The grain safety management institution shall be established for grain safety management.

11.3 Various departments of the grain safety management institution shall be staffed with grain professionals and management personnel who have been professionally trained.

## **12 Record and Document Management**

12.1 The corresponding record management system shall be established for detailed record of grain procurement, inspection, storage, transportation and other processes.

12.2 All records shall be subject to the signature or seal for review by the operational staff and relevant management personnel, and in case of any modification of record, it is forbidden to remove the original contents and the modifier shall attach his signature or seal near to the modified contents.

12.3 The relevant records shall be kept for a minimum of two years.

12.4 The document management system and archive hall be established.

12.5 The advanced technological means (e.g., computer information system) are encouraged to use for record and document management.

## **Appendix A**

### **Guide to moisture content and moldy kernel monitoring procedures in storage and transportation process**

#### **A.1 Test Content**

Raw moisture content and moldy kernel.

#### **A.2 Test Period**

The safe moisture grain shall be tested quarterly; and the over safe moisture grain shall be tested at least monthly. When the temperature rise is found, the grain shall be tested by needle-point sampling at any time.

#### **A.3 Test point arrangement**

A.3.1 The test points shall be set at the locations where the moisture content is changeable.

A.3.2 The test points in bungalow barn shall be arranged uniformly in 3 layers, upper, middle and lower, at 0.3m to the grain surface, barn bottom and barn wall, respectively, and 3-10 additional test points shall be set in the middle of the pile accordance to the size of the grain pile. The additional test points shall also be set near the door, windows and ventilation duct.

A.3.3 The test points in silo shall be arranged uniformly in 3 layers, at 0.3m to the grain surface, silo bottom and silo wall at in 5 orientations as East, South, West, North and Center, respectively, and 3-10 additional test points shall be set in the middle of the pile according to the size of the grain pile. The additional test points shall also be set near the inspection hole, grain in-silo opening, out-silo opening and ventilation duct.

A.3.4 The test points in shallow silo shall be arranged uniformly in 3 layers, at 0.3m to the grain surface, silo bottom and silo wall at in 5 orientations as East, South, West, North and Center, respectively, and 3-10 additional test points shall be set in the middle of the pile according to the size of the grain pile. The additional test points shall also be set near the inspection hole, natural ventilation opening, grain in-silo opening, door, out-silo opening and ventilation duct.

A.3.5 The test points for other granary barns shall be set up with reference to the above requirements.

#### **A.4 Safe Moisture Value**

The grain safe moisture varies with the different grain varieties, regions and storage conditions, so the safe moisture value of different grain varieties shall be determined with reference to Table A.1, and the specific safe moisture values shall vary slightly with different regions and storage conditions.

**Table A.1 Safe Moisture Values of Different Grain Varieties**

Variety (Name) of Grain	Wheat	Indica rice	Japonica rice	Corn	Soybean
Safe moisture value / %	12.5	13.5	14.5	14.0	13.0

## **Appendix B**



## **Guide to temperature and humidity monitoring procedures in storage and transportation process**

### **A.1 Test Content**

Test of temperature and humidity of grain, temperature and humidity inside and outside the granary.

### **A.2 Determination of Grade of Pest Grain**

The live pest density shall be calculated separately at each sampling point (when test the internal pests, the sum of live pests inside and outside of the grain shall be calculated), expressed in the number of pests per kilogram of grain sample that the pest density at the point of highest value represents the pest density of the whole grain granary, and then the grade of pest grain shall be determined according to Table B.1.

**Table B.1 Classification of Pest Grain**

Grade of Pest Grain	Pest Density/(pieces/kg)	Main Pest Density (pieces/kg)
Basically pest-free grain	$\leq 5$	$\leq 2$
General pest grain	6 - 30	
Serious pest grain	$> 30$	$> 10$
Note 1: One of the pest density and main pest density that reaches the indicator is the pest grain of this grade. Note 2: The "Main Pest" refers to the corn weevil, rice weevil, rhizopertha dominica, prostephanus truncatus, callosobruchus chinensis, bruchus pisorum, broad bean weevil, araecerus fasciculatus, gelechiid moth and plodia inter punctella.		

### **B.3 Test Frequency**

**B.3.1** When the grain temperature is 15°C or below, the safe moisture grain or basically pest-free grain shall be tested at least once every 15 days; the over safe moisture grain or general pest grain shall be tested at least once every 10 days.

**B.3.2** When the grain temperature is higher than 15°C, the safe moisture grain or pest-free, basically pest-free grain shall be tested at least every 7 days; the over safe moisture grain or general pest grain shall be tested at least once every 5 days.

### **B.4 Temperature Test**

#### **B.4.1 Test device**

The grain test system or other temperature measuring instrument shall be used.

#### **B.4.2 Arrangement of Temperature Test Points**

**B.4.2.1** When the grain test system is used for bulk grain, the test points shall closer to each

other, and the distance between the points shall not be higher than 3m in any direction. If the distance between the points is higher than 3m due to economic or other reasons, the actual distance shall be recorded. The test points in the upper layer, lower layer and around shall be set at the locations 3m to the grain surface, bottom and wall of the granary.

**B.4.2.2** When the grain temperature is tested manually for the bulk grain in a bungalow barn, the test points shall be set by partitions that each partition shall not be larger than 100m<sup>2</sup> and 5 points shall be set at the center and 4 corners, respectively, while these two points along the boundary of two partitions shall be two common points. If the height of grain pile is below than 2m, the test points shall be divided into 2 layers: upper and lower; if the height of grain pile is 2m - 4m, the points shall be divided into 3 layers: upper, central and lower; if the height of grain pile is 4m - 6m, the points shall be divided into 4 layers; and the height of grain pile is above 6m, the layers shall be appropriately increased. The upper and lower test points shall be set at 0.3m to the grain surface and bottom, respectively. The central layer test points shall be set at equally set vertically. The test points around shall be set at 0.3m to the wall.

**B.4.2.3** The test points of packed grain shall be set with reference to the principles above.

**B.4.2.4** The granary temperature test points shall be set in space at the middle of the pile surface, 1m to the surface of the grain, there shall be no lighting and other heat sources around the test points.

**B.4.2.5** The air temperature test points shall be set in the shelter in the open space outside the granary, 1.5m to the ground surface.

## **B.5 Humidity Test**

**B.5.1** The humidity sensor shall be used to measure the relative humidity in the grain pile; the humidity sensor, dry wet bulb thermometer or other humidity meters shall be used to measure the relative humidity of the air inside and outside the granary.

**B.5.2** The test points in the grain pile shall be set by partitions that each partition shall be 100 m<sup>2</sup> - 400m<sup>2</sup> and 5 test points shall be set at the center and 4 corners, respectively, in two layers, 0.3m to the grain surface and bottom, while the test points around shall be set at 0.3m to the wall.

**B.5.3** The test points of air relative humidity inside the granary shall be set in the space at the middle of the pile surface 1m to the grain surface, and there shall be no lighting and other heat sources around the test points.

**B.5.4** The test points of air relative humidity outside the granary shall be set in the shelter in the open space outside the granary, 1.5m to the ground surface.

**END OF TRANSLATION**